OST Docket

121883

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NHTSA-01-8876-1

12 January 2001

Steve Wood
Assistant Chief Counsel for Rulemaking,
US National Highway Traffic Safety Administration

Dear Mr. Wood,

Please find enclosed a 9-page petition (and a 2-page summary thereof) asking NHTSA to take action to prevent the illness and death caused by carbon monoxide from motor vehicles.

I hope you will find these documents self explanatory, but I encourage you to contact me if you have any questions or need further information.

As a dual citizen of Canada and the US, I am filing this simultaneously with the Road Safety Directorate of Transport Canada.

Sincerely,

Albert Donnay, MHS

PETITION

To: United States' National Highway Traffic Safety Administration (NHTSA) and Transport Canada's Road Safety Directorate (RSD)

Re: Rulemaking Requested to Prevent Illness and Death Caused by Carbon Monoxide from Motor Vehicle Exhaust

Submitted On: 12 January 2001
Submitted To: Steve Wood, Assistant Chief Counsel for Rulemaking, NHTSA, via fax to 202-366-3820
Nicole Pageot, Director General, Road Safety Directorate, Transport Canada, via fax to 613-990-2914
Submitted By: Albert Donnay, MHS, President, MCS Referral & Resources
In USA: 508 Westgate Rd, Baltimore MD 21229-2343, ph 410-566-3333, fax 362-6401
In Canada: Suite 920, 1130 Sherbrooke St. West, Montreal, Quebec, H3A 2S7
Supported By: (a list of individual and organizational supporters of this petition is attached)

"Cars can--and must--be modified to reduce the likelihood that fatal doses of CO can reach the occupants. In the final analysis, the problem is one of changing behavior, not primarily of the motorist—who can't smell an odorless gas—but of those who pick the designs of the vehicles. The death penalty is not appropriate for the unwary owner of a poorly designed car."

Dr. Willam Haddon, Jr., President, Insurance Institute for Highway Safety, 1973 [1]

In memory and honor of Barbara Lighter and the at least 16,000 others who have died of vehicular carbon monoxide poisoning in the United States and Canada since 1991 when NHTSA-funded researchers first reported that all these deaths could be prevented with a carbon monoxide detector then estimated to cost just $11.39 per vehicle.

WHEREAS

1. **NHTSA reported in 1996, and again in 2000, that both suicides and unintentional deaths caused by carbon monoxide (CO) poisoning in motor vehicles are still a significant cause of death—over 1,500 per year--even after the major reductions in CO from vehicle exhaust achieved by the use of catalytic converters first introduced in the 1970s.** NHTSA has published two Research Notes on "Fatalities Associated with Carbon Monoxide Poisoning From Motor Vehicles" compiled by its National Center for Statistics and Analysis based on US mortality data from the National Center for Health Statistics (NCHS). The first, released in December 1996, reviews data from 1993[2] and the second, an update released in April 2000, reviews data from 1995-1997.[3] Vehicular CO (vCO) in stationary vehicles was reported to NCHS as the cause of 1,978 deaths in 1993 and an average of 1,792 deaths per year from 1995-1997. The total is falling at a rate of about 150 deaths per year. Most of the vCO deaths each year are suicides—a relatively constant 85% of the total (representing 5% of all suicides in the NCHS database)--while 12% were unintentional (other studies suggest over half of these also involve alcohol[4,5]) and 3% were of unknown intent. If NHTSA included vCO deaths in stationary vehicles with the other crash-related fatalities it tracks in its FARS database—which it currently does not do—the vCO deaths would add 4% to the total. Only NCHS reports of unintentional vCO poisonings in moving motor vehicles are normally tracked by NHTSA but averaged just 64 such fatalities per year from 1995-1997. The actual figure is probably one to two orders of magnitude larger, however, based on a 1967 Florida study of 88 fatalities in single driver, single vehicle crashes that found 26% with COHb over 10% (high for non-smokers) and 10% with COHb over 20% (high even for smokers).[6] Several other studies have reported similar COHb levels in victims of vehicle crashes,[7,8,9] but all predate the widespread use of catalytic converters that has reduced the average level of CO in vehicle exhaust by over 90%. Assuming that vCO-related fatalities were then and are still roughly evenly distributed among crashes of all kinds and not unique to those involving single vehicles with single occupants, these data suggest that at least 10% of all vehicle fatalities in the 1960s were related to high COHb. Even if only 1% of moving vehicle fatalities are vCO related today, this amounts to over 400 deaths per year, which is almost twice the number of unintentional vCO deaths that occur in stationary vehicles.

2. **NHTSA recognizes a need to warn the public about the "Danger from Carbon Monoxide Poisoning Associated with Motor Vehicles," having issued a press release on this subject on 16 December 1996.**[10] The press release cites data from the 1996 Research Note mentioned above identifying motor vehicles as the primary cause of all unintentional CO deaths (more than from all domestic appliances combined) and warns consumers that "even the best of modern engines is capable of producing a lethal dose in a confined space." NHTSA clearly recognizes CO poisoning as a lethal hazard associated with the operation of ***any and all*** motor vehicles. The press release concludes by quoting NHTSA Administrator Dr. Ricardo Martinez MD, a board certified emergency medicine physician, as saying: "Take proper precautions with every motor vehicle." By way of precautions, however, Dr. Martinez offers only the following tips:
* get your exhaust system inspected once a year before cold weather begins for any holes that might allow CO to enter your vehicle
* inspect your tail pipe after heavy snowfalls before starting the engine to be sure it is not blocked by snow
* when idling, keep a window at least partly open
* don't sit in a vehicle that is idling in a closed garage or confined space.

   The press release says "needless deaths can be prevented by avoiding the conditions that place vehicle occupants in closed spaces where exhaust accumulates" which appears to put more blame and responsibility on the victims than the vehicle manufacturers. The press release does not mention the potential of CO detectors to warn vehicle occupants at low levels and save their lives at high levels, about which NHTSA has known since at least 1991 (see below).

3. **NHTSA has acted on CO-related problems in motor vehicles in the past, having issued CO-related recalls for 4,000 passenger vehicles in 1979 (involving 2 models) and 13,988 recreational vehicles (RVs) from 1984 to 2000 (involving 12 models, including 4 recalled in 1999 because they were sold with defective CO detectors).** NTHSA even recalled 12 unmotorized travel trailers in 1994 because they were sold with cook stoves that were mistakenly set up to burn natural gas instead of the propane commonly used in RVs, creating a potentially lethal CO hazard (see Table 1, below). While the Recreational Vehicle Industry Association requires its manufacturing members to install CO detectors as original equipment in all their RVs, these CO detectors are not required to have digital displays or engine cut-off switches, which in the case of RVs would need to be linked not just to the vehicle's engine but to all its fuel burning appliances, including the water heater, oven, range and auxiliary power generator. Most of NHTSA's CO-related RV recalls have been due to the defective design, installation or ventilation of these appliances.[11]

4. **NHTSA has known since at least 1991 that a CO detector--then costing only an estimated $11.39 in parts--could prevent both CO poisoning and CO deaths from motor vehicles if it were installed in the passenger compartment and linked to both a low-level digital display and an engine cut-off switch that would automatically shut off the engine before lethal levels were reached.** This is documented in a 1991 report commissioned by NHTSA from researchers at the Carnegie Mellon Research Institute in Pittsburgh entitled "Carbon Monoxide Monitor for Automobile Passenger Compartment."[12] (Although not an issue at the time, such a device would also prevent the unknown number of vCO poisonings and deaths caused by the inadvertent starting and idling of vehicles inside closed garages by children who find and play with remote starters, a now common option on many vehicles). The Carnegie Mellon researchers also recommended that CO detectors be installed in vehicles with both a digital display on the dash so that the driver could monitor low levels of CO and some kind of (silenceable) audio-visual warning signal so that the driver could be alerted to take corrective action (like opening windows) whenever the CO level exceeded whatever limit is deemed acceptable. Unfortunately, NHTSA never acted on these recommendations and never funded any more vCO-related research, although Australian researchers reported similar findings in a technical paper presented at the 2000 World Congress of the Society of Automotive Engineers in Detroit.[13] Since NHTSA's 1991 study did not specify either an engine cut-off level or a driver

warning level, this petition recommends that NHTSA establish 200 parts per million (ppm) of CO as the engine cut-off level. This is the maximum or ceiling level of occupational exposure to CO recommended by the US National Institute for Occupational Safety and Health--the level at which any workplace should be immediately evacuated--and clearly a level at which no one should be driving. (CO measurements made in the tunnels around Pittsburgh during winter rush hour –when vehicles may be stuck idling inside for more than 30 minutes--suggest that 150ppm is the highest level ever likely to be encountered while driving today, although several times this were measured in the past, prior to the widespread use of catalytic converters.[14]) This petition recommends that a low level warning light and sound be activated at 10 ppm since the US Environmental Protection Agency's limit for the average outdoor exposure of the general public is 9ppm (there are no EPA standards for indoor air) and Health Canada's limit is 11ppm. Nine ppm also is the level above which the Baltimore City Fire Department and many others in North America require the immediate evacuation of any building occupants.[15] CO limits established for healthy workers are much higher—ACGIH allows 25ppm, NIOSH 35ppm and OSHA 50ppm—and not appropriate people at much greater risk from low levels of CO such as pregnant women, children, the elderly and people with chronic disease of any kind. Standard household CO alarms built to the specifications of UL 2034 or IAS 696D as recommended by the US Consumer Product Safety Commission also are not appropriate for use in vehicles because they are not permitted to display the CO level below 30ppm (three times the EPA limit) or to alarm until over 70ppm for anywhere from one to four hours, over 150 ppm for 30 minutes to one hour, or over 400ppm (twice the NIOSH limit for immediate evacuation!) for 5 to 15 minutes.

5. **NHTSA rejected a petition filed in 1997 that asked NHTSA to require vehicle manufacturers to offer CO detectors as optional original equipment and include information about CO hazards and optional CO detectors in their owners' manuals.** The petition was filed by Herb Dennenberg, then an NBC-10 TV news reporter in Philadelphia, who submitted it as a private citizen, independent of NBC. He cited a projected cost of $16 per CO detector. NHTSA claimed in its denial there was insufficient evidence that simply putting CO detectors in vehicles would save lives[16] and we agree: the petitioner did not suggest that CO detectors be linked to an engine cut-off switch or even a digital display on the dash. NHTSA also questioned the cost, claiming the expense of installing such detectors in the approximately 15 million vehicles sold each year in the US could not be justified based on the relatively small number of unintentional deaths in stationary vehicles that might be saved by a CO detector. But NHTSA's analysis failed to include the much larger number of suicides, still over 1,000 per year, that would be prevented by a CO detector linked to an engine cut-off switch, and the unknown number of moving vehicle crashes (at least 100) that might be averted by low-level CO warnings. If these are included, and assuming a more realistic price of $25 per CO detector, the cost per life saved would fall to under $200,000. NHTSA also denied the petitioner's request that vehicle manufacturers be required to include information about vCO hazards and CO detectors in their owners' manuals. NHTSA said it planned "to address the problem in a more universal manner" by issuing "annual consumer advisories about the hazards of CO starting in the Fall of 1996," but the first advisory it issued on CO--on 16 December 1996 (see above)—has not been followed by any others since, despite a continuing toll of over 1,500 vCO deaths per year.

6. **In contrast, NHTSA has required inexpensive vehicle safety modifications to prevent deaths from much less common causes of non-moving fatalities, such as trunk entrapment (fewer than 400 deaths documented since 1970, an average of under 15 per year[17]), and also very expensive modifications, such as air bags, to reduce deaths from moving vehicles, which have saved approximately 5,000 lives since 1990, an average of 500 per year.[18]** Had CO detectors with engine cut-off switches been required in new vehicles by NHTSA as recommended by Carnegie Mellon researchers in 1991, even if only installed starting in 1995, over 75 million vehicles in N. America would now be protected, saving thousands of lives per year for less than 1/10th the cost of air bags. But both the $11 metal oxide CO detectors they recommended in 1991 and the relatively crude $16 non-digital biomimetic detectors recommended by the petitioner in 1997 (which do not measure CO directly

but only estimate its effect on human COHb levels) are not as reliable or accurate as the digital electrochemical (EC) and non-dispersive infra-red (NDIR) detectors that are now commercially available for a variety of applications. Having worked on development of the first low-level CO monitor in 1999--it uses an EC sensor with a digital readout from 5-150ppm and provides an instantaneous warning above 9ppm--I am confident that this technology could be adapted for motor vehicle use and available commercially within one year at most. If powered by the vehicle's battery or its own rechargeable batteries and shielded from extremes of temperature and humidity in a well insulated capsule, an EC detector could operate continuously for at least 5 years before its sensor—which costs less than $3 to manufacture--would need to be replaced. NDIR detectors, although more expensive, are the most accurate. They offer the only sensor technology specific to CO that never suffers any interference from other gases, can function over the full range of ambient temperatures (-40 to +40C) and humidity (0 to 99.9%RH) found inside vehicles in N. America, and never needs to be replaced. Unfortunately, no CO detector manufacturers are interested in adapting their technologies for motor vehicles unless and until such detectors are required in all vehicles, given the strong resistance to optional safety features that vehicle manufacturers have shown in the past.

7. **NHTSA has not funded any extramural research on CO-related issues since 1991 and, despite publishing two compelling Research Notes and one press release on CO in 1996, it has not included CO in any of its own research programs or policy initiatives since then. CO also has never been studied by NHTSA researchers working on potentially CO-related problems such as drowsy drivers and passenger cabin air quality. And NHTSA has not yet begun to investigate a recent three-fold increase in vCO-related consumer complaints.** While NHTSA received an average of less than 12 vCO-related consumer complaints per year about specific vehicles from 1995-1999 (including just 2 reports of deaths from vCO, despite almost 10,000 such deaths reported to NCHS in the same 5-year period), it received 32 in 2000, an almost three fold increase, due mostly to a 650% increase in vCO complaints about sport utility vehicles (see Table 2 below). Complaints about passenger cars, minivans, pickups and RVs also increased dramatically, and so far involve 14 different manufacturers.[19] Some of these vCO complaints are related to obvious design defects while others resulted from leaks in the exhaust system (commonly at the manifold or catalytic converter) and/or leaks into the passenger compartment (via fresh air intakes, holes in the floor, poorly fitted door or window seals, etc.) Even well maintained gasoline vehicles emit lethal levels of carbon monoxide in their exhaust (up to tens of thousands of ppm) for a minute or two when first started, especially if their engine, catalytic converter and/or the outside air temperature are cold. Even when engine, converter and outside air are all hot, gasoline vehicles may still emit up to 1,000 ppm. When cold vehicles are started in attached but unventilated garages, such as are now typically built into most US and Canadian suburban homes, their exhaust may raise the CO level in the garage to over 100 ppm within a minute and, if left idling even a few minutes, to over 1,200 ppm. This is the level deemed "immediately dangerous to life" by the US National Institute for Occupational Safety and Health. Unless vehicle occupants open more than one window at a time for several minutes, which people rarely do in winter, it may take 15 minutes or more to dissipate even the low-levels of CO (in the range of 5 to 50ppm) that commonly accumulate in vehicles started inside garages (more if the vehicle is idled with a door or window left open) and vehicles that drive (or stop) within a few feet of other vehicles' tailpipes, especially if both vehicle are idling, such as at a stop light or in a traffic jam.[20]

8. **The detrimental effects of CO exposure on driving performance were first reported in 1937,[21] and an increase in minor driving 'accidents' associated with high carboxyhemoglobin (COHb) was first reported in 1961.[22] The first rigorous study of driving performance at COHb levels under 10% was reported in 1970.[23] It found increases in the drivers' time to respond to taillight intensities, increases in their driving velocity, a failure to slow down properly while cornering, decreases in time estimation, and decreases in the precision with which drivers maintained a 200-foot separation distance. Visual field constriction and decrements in visual target detection time were later found at**

4% to 8% COHb.[24] A double-blind driving simulator study of 50 adults exposed to 80ml of either CO or plain air found a highly significant deficit in "careful driving" skills associated with the CO exposure, even though COHb levels rose to an average of only 3.4%.[25] In terms of CO levels, exposure of healthy adult males to as little as 25ppm for just 1 to 1.5 hours was shown in 1998 to significantly impair both mental and physical functioning, particularly short-term memory, attention span and coordination.[26] Any exogenous CO exposure interacts with the human body's own systemic low-level production of CO (normally in the range of just 1-2ppm, primarily from the breakdown of heme proteins by heme oxygenase, the universal stress enzyme) and the body's use of CO as a gaseous neurotransmitter in the control of numerous functions including heart rate, respiration, vasodilation, learning and recall of memory, vision, olfaction, and sensory sensitization. A hallmark symptom of chronic low-level CO poisoning of particular concern to drivers is multi-sensory sensitivity (aka Muses Syndrome), which leaves people hypersensitive to bright lights such as headlights, loud sounds such as horns and sirens, and inhaled chemicals, especially carbon monoxide from motor vehicle exhaust.[27] All these effects may occur sooner and at even lower levels in those at greater risk from CO, including pregnant women, children, the elderly and anyone with a chronic disease of the heart, lungs or blood, such as angina, asthma or anemia. Repeated low-level exposure to CO may exacerbate these conditions and is known to cause a great variety of other mental and physical symptoms that may persist for months or years if untreated.[28]

9. **The US Surgeon General's current "National Suicide Prevention Strategy" includes under the broad category of "Intervention"(Section 2) the need to "Promote efforts to reduce access to lethal means and methods of self harm" (Objective 5) and specifically to "Implement standards for automobile exhaust systems that impede automobile exhaust mediated asphyxiation" (Objective 5.5)[29]** This objective is especially important for means of suicide such as vCO that are relatively effective. Even vehicles equipped with catalytic converters can kill people within minutes if their exhaust is piped back into the vehicle, leaving little time for potential suicides to change their minds, be discovered or otherwise be interrupted. But an engine cut-off switch activated by a CO detector in the passenger cabin would prevent both suicides and unintentional deaths from vCO without requiring any changes in exhaust systems or emissions. Although some people whose suicide attempt was foiled by such a device might try to kill themselves again by other means and some of these might eventually succeed, many of those who survive their first attempt—including this petitioner's mother--thankfully never try again. While no US studies or statistics are available on the success rates of first versus repeat suicide attempts, a recent Australian cross-sectional cohort study has looked at psychological profiles of attempted versus completed suicides involving vCO.[30] Both groups had similar sociodemographic characteristics and their degree of suicide intent was rated as "low" since few had left a note or spent much time planning. Most of the survivors said they regretted their vCO attempt and denied any further suicide ideation. Their most common diagnosis was adjustment disorder with depressed mood--a readily treatable condition with a variety of treatment options.

THEREFORE

On behalf of the at least 16,000 North Americans who have died needlessly from vehicular CO poisoning since NHTSA was first informed in 1991 of the life-saving potential of CO detectors linked to engine cut-off switches, and on behalf of the hundreds more who will die of vehicular CO every year until vehicle manufacturers are required to warn consumers about and protect them from this lethal hazard, I—an environmental health engineer, certified carbon monoxide analyst, president of MCS Referral & Resources, and a dual citizen of the United States and Canada—petition both NHTSA and the Canadian RSD to do the following:

A. **Beginning in 2001, start issuing an annual consumer advisory warning (in the form of a press release and public service announcements) about the dangers of vCO and recommending the use of portable low-level digital CO monitors inside motor vehicles**

that can warn vehicle occupants about low levels of CO before they become lethal. These advisories should specifically recommend low-level CO monitors and warn consumers against using household CO alarms that comply with the UL 2034 or IAS 696D standards in their vehicles since these are designed only for use in buildings and do not read out below 30ppm or alarm below 70ppm, twice the average level recommended by US NIOSH for healthy workers. Even above 400ppm—twice the level at which US NIOSH recommends immediate evacuation—UL and IAS require that the CO alarms wait 5 to 15 minutes before giving off any warning. But in a small enclosed garage where CO levels may be rising quickly, even a 5-minute delay could be fatal.

B. **Beginning in 2001, start tracking and publicly reporting all vCO-related deaths (in each country), both suicides and unintentional fatalities in stationary and moving vehicles, on an annual basis, using data on these causes already collected by the US NCHS and Health Canada.**

C. **Beginning in 2002, start funding intramural and extramural research into the causes, effects, detection and prevention of vCO exposure inside vehicles. All NHTSA-funded researchers studying the impact of human factors such as drowsiness and alcohol consumption on driving performance should be encouraged to study the interaction of such factors with vCO and to at least control for vCO exposure in their study designs.**

D. **Beginning in 2003, require vehicle manufacturers to include detailed information in their new vehicle owners' manuals about the health dangers of vCO** (specifying common symptoms that impair driving and which may be CO-related including impaired vision, headache, dizziness, difficulty concentrating, and hypersensitivity to bright lights, noise, vehicle exhaust, odors and other sources of CO), **and the life-saving potential of CO detectors, and tips for reducing vCO exposure**, such as not idling vehicles inside garages even with the door open, and not following behind other vehicles too closely, especially in cold weather.

E. **Beginning in 2003 or 2004 at the latest, require vehicle manufacturers to install CO detectors in the passenger compartment of all new motor vehicles--and to offer equivalent devices as optional upgrades for older vehicles--featuring a digital display and some kind of temporarily silenceable audiovisual warning activated instantly by any CO levels above 9ppm.** A low-level CO warning is especially needed for pregnant women, children, the elderly and diseased people at greater risk from CO poisoning. It should direct the occupants to open windows and vents if the vehicle is moving or close them if it is not moving. Opening or turning up a vehicle's fresh air intake is not advised since this may bring more CO into the vehicle if the intake is located near the CO source, such as a leaking exhaust manifold under the hood. Since even diesel and electric vehicles, which produce little or no CO themselves, may accumulate high levels of CO in their passenger compartments from exposure to the exhaust of gasoline vehicles around them, especially if directly in front of them, this safety modification should be required of all vehicles.

F. **Beginning in 2003 or 2004 at the latest, require manufacturers of vehicles with gasoline engines (<u>only</u>) to connect the built-in CO detector to an engine cut-off switch designed to instantly shut off the ignition and engine as soon as and as along as the CO level inside the vehicle exceeds 200ppm (the NIOSH evacuation limit), provided for safety reasons that the vehicle is not already moving. If the vehicle is moving when CO levels exceed 200ppm (a most unlikely scenario), the occupants should be directed to open more than one window immediately.** This should be accomplished via a different and non-silenceable audio/visual warning, such as a digitally recorded voice message on a chip that would repeat these instructions urgently in English and Spanish (for vehicles sold in the US) or English and French (for vehicles sold in Canada) until the CO level in the passenger compartment fell below 200ppm. In vehicles with electric windows, the detector could be wired to open them all automatically at levels above 200ppm, but this should only be done if the vehicle is moving. If

the vehicle is stationary, CO levels outside may be much higher (as in a garage, for example), in which case the occupants are better off leaving the windows and vents shut until the vehicle is outside in fresh air. If anyone attempts to start or restart a vehicle when the ambient CO level exceeds 200ppm, the CO detector should immediately again detect this and either prevent the engine from starting or shut it off as soon as it does. **Given the many CO producing appliances that have been implicated in CO-related RV recalls, RV manufacturers also should be required to install CO cut-off switches on each gas or propane appliance and auxiliary power generator in their vehicles, so that these appliances can be switched off independently from the engine, even if the vehicle is in motion.** Electrochemical CO detectors that instantly cut-off furnaces and/or water heaters at high levels have been commercially available and in home use since the mid-1990s, at an installed cost of less than $50 per unit. If required in all new motor vehicles, detector manufacturers estimate the cost would fall to less than $25 per unit.[31]

TABLES

TABLE 1. All NHTSA Recalls Related to Carbon Monoxide

(unpublished complaint data provided by NHTSA Public Affairs, 202-366-9550)

*Vehicle Make/**Model and Type: MH=Motorhome*** TT=Travel Trailer	Model Year(s) Recalled and **# of Units**	**When Recalled** *and Why* (listed chronologically with most recent first)
Fleetwood/Vision MH **Fleetwood**/Southwind MH	1999 & 2000, **276** (no breakdown)	**31 Mar 2000**. *Generator tailpipe terminates under the slide out room when the slide out room is extended, allowing CO to seep into the living area.*
Tiffin/Allegro MH **Western**/Alpine MH **Fleetwood**/Fleetwood MH **BlueBird**/Wanderlodge MH	1999, **40** 1999, **92** 1999, **5** 1999 & 2000, **58** (plus **392** sold direct by Atwood to consumers)	**1 Oct 1999**. *Defective CO Alarm may fail to go off, possibly resulting in the death of MH occupants (although no deaths had been reported) Atwood Mobile Products conducted this recall of Kidde Nighthawk detectors sold the Atwood label*
Holiday Rambler/ Navigator MH	1994, **11**	**25 July 1994**. *Inadequately sealed and vented heating system allows CO to seep into living area.*
Fleetwood/Terry TT **Fleetwood**/Prowler TT **Fleetwood**/Wilderness TT	1994, **142** (no breakdown)	**17 Mar 1994**. *Magic Chef cook stoves designed to burn natural gas were installed for use with propane causing incomplete combustion & high levels of CO*
Fleetwood/Limited MH **Fleetwood**/PaceArrow MH **Fleetwood**/Southwind MH	1985 & 1986 **12459** (no breakdown)	**Late 1985** *Generator tailpipe can become damaged so that it terminates under the body of the MH allowing CO to seep into the living area.*
Executive/Executive MH **Executive**/Diplomat MH	1984 & 1985 **655** (no breakdown)	**2 Apr 1985**. *Auxiliary power generator exhaust is located under the MH allowing CO to seep into the living area.*
Chrysler/Cordoba **Dodge**/Mirada (same car, different names)	1980, **4000** (no breakdown)	**10 Nov 1979**. *Improperly retained plastic sealing plugs in the rear quarter panel trunk area allow CO to enter passenger compartment.*
TOTAL OF 8 CO-Related RECALLS by NHTSA in 22 YEARS (1979-2000)	**4000 Cars** **13988 MHs** **142 TTs**	

TABLE 2. Complaints Filed with NHTSA Concerning Carbon Monoxide, 1995-2000
(unpublished complaint data provided by NHTSA Public Affairs, 202-366-9550)

Type of Vehicle	# of Complaints in 1995-1999 total & avg vs. 2000 alone	Vehicle Makes Cited in CO Complaints, 1995-1999	Vehicle Makes Cited in CO Complaints, 2000
Passenger Car	25 (avg 5) vs. 7	Chevrolet, Ford, Lincoln, Mazda	Chevrolet, Dodge

SUMMARY OF PETITION

To: United States' National Highway Traffic Safety Administration (NHTSA) and Transport Canada's Road Safety Directorate (RSD)
Re: Rulemaking Requested to Prevent Illness and Death Caused by Carbon Monoxide from Motor Vehicle Exhaust
Submitted On: 12 January 2001
Submitted To: Steve Wood, Assistant Chief Counsel for Rulemaking, NHTSA, via fax to 202-366-3820
Nicole Pageot, Director General, Road Safety Directorate, Transport Canada, via fax to 613-990-2914
Submitted By: Albert Donnay, MHS, President, MCS Referral & Resources
In USA: c/o 508 Westgate Rd, Baltimore MD 21229-2343, ph 410-566-3333, fax 362-6401
In Canada: c/o 1130 Sherbrooke St. West, Suite 920, Montreal, Quebec, H3A 2S7
Supported By: (a list of individual and organizational supporters of this petition is being submitted separately)

"Cars can--and must--be modified to reduce the likelihood that fatal doses of CO can reach the occupants. In the final analysis, the problem is one of changing behavior, not primarily of the motorist—who can't smell an odorless gas—but of those who pick the designs of the vehicles. The death penalty is not appropriate for the unwary owner of a poorly designed car."
Dr. Willam Haddon, Jr., President, Insurance Institute for Highway Safety, 1973

In memory and honor of Barbara Lighter and the at least 16,000 others who have died of vehicular carbon monoxide poisoning in the United States and Canada since 1991 when NHTSA-funded researchers first reported that all these deaths could be prevented with a carbon monoxide detector then estimated to cost just $11.39 per vehicle.

WHEREAS **[summaries only, see full petition for details and references]**

1. **NHTSA reported in 1996, and again in 2000, that both suicides and unintentional deaths caused by carbon monoxide (CO) poisoning in motor vehicles are still a significant cause of death—over 1,500 per year--even after the major reductions in CO from vehicle exhaust achieved by the use of catalytic converters first introduced in the 1970s.**

2. **NHTSA recognizes a need to warn the public about the "Danger from Carbon Monoxide Poisoning Associated with Motor Vehicles," having issued a press release on this subject on 16 December 1996.**

3. **NHTSA has acted on CO-related problems in motor vehicles in the past, having issued CO-related recalls for 4,000 passenger vehicles in 1979 (2 models) and 13,988 recreational vehicles from 1984 to 2000 (12 models, including 4 recalled in 1999 because they were sold with defective CO detectors).**

4. **NHTSA has known since at least 1991 that a CO detector--then costing only an estimated $11.39 in parts--could prevent both CO poisoning and CO deaths from motor vehicles if it were installed in the passenger compartment and linked to both a low-level digital display and an engine cut-off switch that would automatically shut off the engine before lethal levels were reached.**

5. NHTSA rejected a petition filed in 1997 that asked NHTSA to require vehicle manufacturers to offer CO detectors as optional original equipment and include information about CO hazards and optional CO detectors in their owners' manuals.

6. In contrast, NHTSA has required inexpensive vehicle safety modifications to prevent deaths from much less common causes of non-moving fatalities, such as trunk entrapment (fewer than 400 deaths documented since 1970, an average of under 15 per year), and also very expensive modifications, such as air bags, to reduce deaths from moving vehicles, which have saved approximately 5,000 lives since 1990, an average of 500 per year.

7. NHTSA has not funded any extramural research on CO-related issues since 1991 and, despite publishing two compelling Research Notes and one press release on CO in 1996, it has not included

CO in any of its own research programs or policy initiatives since then. CO also has never been studied by NHTSA researchers working on potentially CO-related problems such as drowsy drivers and passenger cabin air quality. And NHTSA has not yet begun to investigate a three-fold increase in vCO-related consumer complaints.

8. The detrimental effects of CO exposure on driving performance were first reported in 1937.

9. The US Surgeon General's current "National Suicide Prevention Strategy" includes under the broad category of "Intervention"(Section 2) the need to "Promote efforts to reduce access to lethal means and methods of self harm" (Objective 5) and specifically to "Implement standards for automobile exhaust systems that impede automobile exhaust mediated asphyxiation" (Obj. 5.5)

THEREFORE [summaries only, see full petition for details and references]

On behalf of the at least 16,000 North Americans who have died needlessly from vehicular CO poisoning since NHTSA was first informed in 1991 of the life-saving potential of CO detectors linked to engine cut-off switches, and on behalf of the hundreds more who will die of vehicular CO every year until vehicle manufacturers are required to warn consumers about and protect them from this lethal hazard, I—an environmental health engineer, certified carbon monoxide analyst, president of MCS Referral & Resources, and a dual citizen of the United States and Canada—petition both NHTSA and the Canadian RSD to do the following:

A. Beginning in 2001, start issuing an annual consumer advisory warning (in the form of a press release and public service announcements) about the dangers of vCO and recommending the use of portable low-level digital CO monitors inside motor vehicles that can warn vehicle occupants about low levels of CO before they become lethal.

B. Beginning in 2001, start tracking and publicly reporting all vCO-related deaths, both suicides and unintentional fatalities in stationary and moving vehicles, on an annual basis, using data on these causes already collected by the US NCHS and Health Canada.

C. Beginning in 2002, start funding intramural and extramural research into the causes, effects, detection and prevention of vCO exposure inside vehicles. All NHTSA-funded researchers studying the impact of human factors such as drowsiness and alcohol consumption on driving performance should be encouraged to study the interaction of such factors with vCO and to at least control for vCO exposure in their study designs.

D. Beginning in 2003, require vehicle manufacturers to include detailed information in their vehicle owners' manuals about the health dangers of vCO, the life-saving potential of CO detectors, and tips for reducing vCO exposure.

E. Beginning in 2003 or 2004 at the latest, require vehicle manufacturers to install CO detectors in the passenger compartment of all new motor vehicles--and to offer equivalent devices as optional upgrades for older vehicles--featuring a digital display and some kind of temporarily silenceable audiovisual warning activated instantly by any CO levels above 9ppm.

F. Beginning in 2003 or 2004 at the latest, require manufacturers of vehicles with gasoline engines (only) to connect the built-in CO detector to an engine cut-off switch designed to instantly shut off the ignition and engine as soon as and as along as the CO level inside the vehicle exceeds 200ppm (the NIOSH evacuation limit), provided for safety reasons that the vehicle is not already moving. If the vehicle is moving when CO levels exceed 200ppm (a most unlikely scenario), the occupants should be directed to open more than one window immediately.

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